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Engine Wear Test (Oil Analysis): Toyota Yaris 2015

The Yaris is a 1.3 L 5 door hatch with 10,000 km oil change intervals. The engine was run in for 10,000 km before testing was started and treated once with Xcelplus at 20,000 km.

Summary

Wear in the engine was reduced significantly at 50,000 km:

-82 % Iron

-57 % Aluminium

-91 % Copper

Table 1 Reduction in wear

Metal	Reduction (ppm)
Iron (Fe)	-18 (-82 %)
Aluminium (Al)	-4 (-57 %)
Copper (Cu)	-10 (-91 %)
Chromium (Cr)	n/a
Tin (Sn)	-2 (-100 %)
Nickel (Ni)	-2 (-100 %)
Lead (Pb)	-1 (-100 %)
Viscosity @ 100 °C	+1.9 (+13 %)
Viscosity @ 40 °C	+22 (+20 %)

Table 2 Oil and filter changes

Mileage	Comments
10,332 km	Oil change
20,607 km	First oil sample taken (Xcelplus added)
30,622 km	Second oil sample taken
40,988 km	Third oil sample taken
50,865 km	Fourth oil sample taken

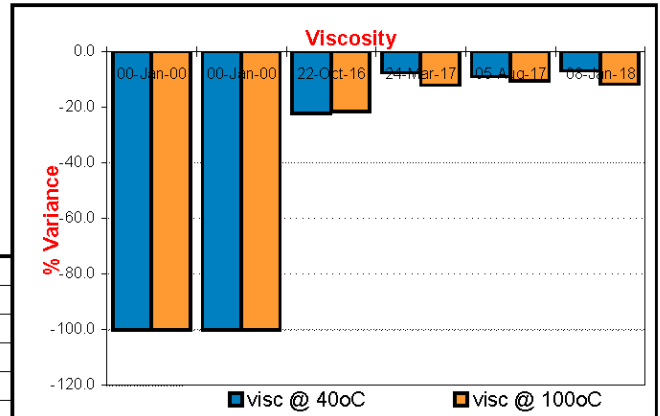
N.B. Raised silicon (dirt) levels correspond to driving on dirt roads in the country: The air filter was changed three times to ensure the problem was not a faulty filter. The Viscosity Variance Report showed significantly improved oil quality.



Figure 1 Yaris 2015 white 1.3 L 5 door hatch

TECHNICAL ADVANCE FOR ECONOMIC GAIN

Wear Metal Report: 356,546
Client: MICHAEL CZAJKA
Attention:
Machine: TOYOTA YARIS **ID No:** 1FD1FN
Oil Name: SYNTECH SEMI SYN15W50
Visc@40°C: 144 **Visc@100°C:** 19 **TBN:** 0
Compartment: TOYOTA YARIS



Sample Date	0/01/1900	0/01/1900	22/10/2016	24/03/2017	5/08/2017	8/01/2018		
Analysis Date	0/01/1900	0/01/1900	1/11/2016	29/03/2017	8/09/2017	12/01/2018		
Sample no.	0	0	343502	347771	352928	356546		
SMU	0	0	20,607 km	30,622 km	40,988 km	50,865 km		
Oil km	0	0		10,015	10,366	9,877		
Oil Changed	0	0	Yes	Yes	Yes	Yes		
Wear Metals	ppm	ppm	ppm	ppm	ppm	ppm	Caut	High
lead	0	0	1	0	0	0	60	80
iron	0	0	22	7	6	4	75	95
aluminium	0	0	7	4	4	3	10	16
copper	0	0	11	3	1	1	20	30
chromium	0	0	0	0	1	0	10	15
tin	0	0	2	0	1	0	10	15
nickel	0	0	2	0	0	0	10	15
Contaminants								
silicon	0	0	52	40	42	30	20	35
sodium	0	0	4	5	4	3	20	30
Oil Additives								
magnesium	0	0	3	2	2	1	0	0
zinc	0	0	954	749	702	578	0	0
molybdenum	0	0	6	4	1	0	0	0
calcium	0	0	1767	1732	1731	1519	0	0
phosphorous	0	0	0	620	629	554	0	0
boron	0	0	0	0	0	2	0	0
Infra Red								
TBN	0.00	0.00	0.00	0.00	0.00	0.00	-25%	-50%
soot	0	0	1	3	0	0	50	70
glycol%	0	0	0	0	0	0	1	2
water (ppm)	0.00	0.00	0.00	0.00	0.00	0.00	1	2
fuel dilution%	0	0	1	0	0	0	1	2
oxidation	0	0	15	14	17	16	30	40
nitration	0	0	11	10	11	22	30	40
sulphation	0	0	20	19	24	23	30	40
TAN	0.00	0.00	0.00	0.00	0.00	-	0	0

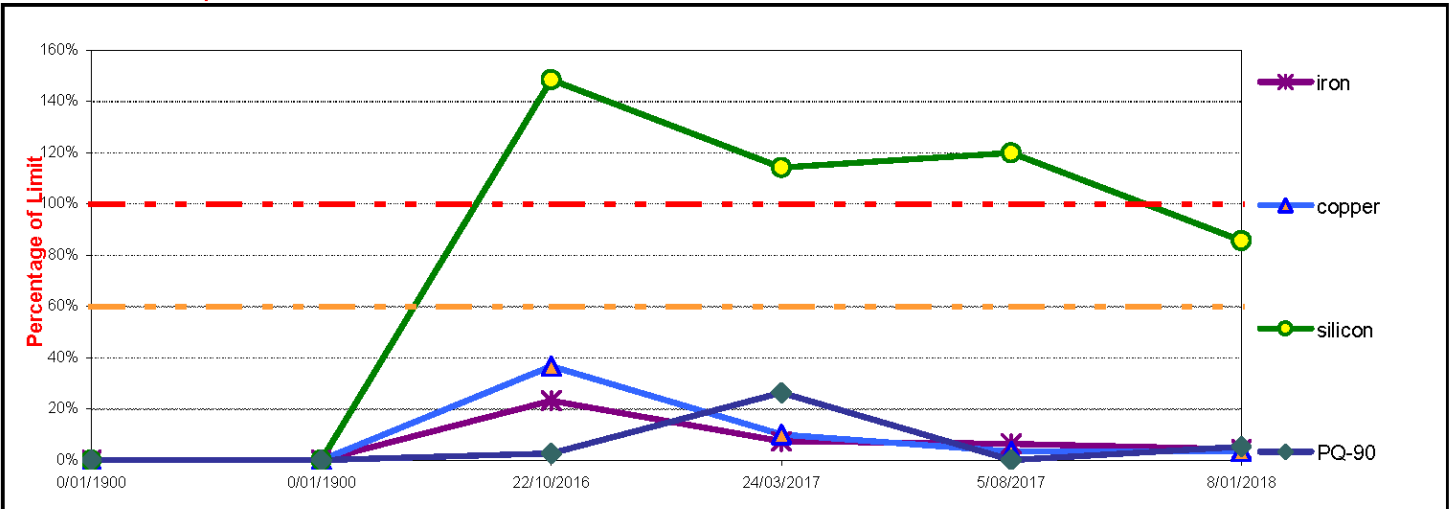
Comments on elevated results

Silicon is elevated at 30ppm. Silicon is a highly abrasive material and can cause accelerated wear. Check air intake system.

Physical Tests	0	0	0	0	0	0	0	0
water %	0	0	0	0	0	0	0	0
PQ-90 mg / ltr	0	0	0	0	0	2	20	38
visc @ 100oC	0.00	0.00	14.90	16.70	17.00	16.76	+10%	+30%
visc @ 40oC	0.00	0.00	112.00	133.00	131.00	134.00	+10%	+30%

Particle Cleanliness Analysis - ISO CODE 4406	
4 µm	-
6 µm	-
14 µm	-
SAE AS 4059 NAS CODE	0

Element Trends Graph



For enquiries, contact: phone: fax: mobile:

This wear analysis and oil condition report should be used in conjunction with normal maintenance and evaluated from sample to sample. Every care will be taken in processing samples but no express or implied guarantee is furnished in regard to the continuing operation or condition of this machinery or any part thereof.